

Application No.: 10/539,479  
Art Unit: 3657

Request for Reconsideration under 37 C.F.R. §1.116  
Attorney Docket No.: 052710

### **REMARKS**

Reconsideration of this application is respectfully requested. Claims 1-5 are pending in the present application. Claims 1-5 stand rejected.

#### **Rejection under 35 U.S.C. §112, second paragraph**

Claim 5 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. More specifically, the Examiner asserts "Regarding claim 5, it is considered indefinite because the terms "gothic" arc is used. This is not an acceptable term to describe the shape of a certain structure." For the reasons set forth in detail below, this rejection is respectfully traversed.

First, the rejection is improper because the Examiner has simply concluded that the language "gothic arc" is indefinite without any explanation as to why this language is considered indefinite. The Manual of Patent Examining Procedure (MPEP), in its guidelines for a proper rejection under §112, second paragraph, states "If upon review of a claim in its entirety, the examiner concludes that a rejection under 35 U.S.C. 112, second paragraph, is appropriate, such a rejection should be made *and an analysis as to why the phrase(s) used in the claim is "vague and indefinite" should be included in the Office action.*" [Emphasis added] See MPEP §2173.02.

The Examiner has simply concluded that the terminology "gothic arc" is not acceptable to describe the shape of an object, with absolutely no analysis as to *why* this terminology is not

acceptable. Therefore, the rejection under §112, second paragraph, is improper and should be withdrawn for at least this reason. If the rejection is not withdrawn, a new Office Action with an explanation as to why the language “gothic arc” is unclear should be provided.

Second, definiteness of claim language must be analyzed, not in a vacuum, but in light of the content of the particular application disclosure (see MPEP §2173.02). The present application disclosure (i.e., the specification and the drawings) makes clear the shape claimed by the language “gothic arc”. For example, Fig. 3 illustrates a shape of a driving roller 12b that has a gothic arc shape composed of two arcs. See also, e.g., page 8, lines 16-19 of the specification as originally filed.

Finally, definiteness of claim language must be analyzed, not in a vacuum, but in light of the teachings of the prior art; and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. See MPEP §2173.02. Attached are Abstracts of published Japanese patent applications that demonstrate that the terminology “gothic arc” is known in the art to describe a shape.

In view of the discussion above, it is respectfully submitted that all claims particularly point out and distinctly claim the subject matter which applicant regards as the invention in accordance with the requirements of §112, second paragraph. Reconsideration and withdrawal of the rejection under §112, second paragraph are, respectfully requested.

#### **Claim Rejections – 35 U.S.C. §103**

Claims 1-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over **Akeno** (JP

07-181275, previously cited) in view of **Michioka et al.** (USP 6,155,717, previously cited). For the reasons set forth in detail below, this rejection is respectfully traversed.

The Examiner applies the same prior art references that were applied against the claims in the previous Office Action. As will be discussed in detail below, the rejection under §103 is respectfully traversed for the following reasons:

*The combination of cited references does not disclose or suggest “a lubricator having applicators for applying lubricant only to contact portions of the [cylindrical] shaft with the driving roller and the driven roller”*

As you know, the Examiner relies on **Akeno** to teach a driving roller 3, a driven roller 2 and a cylindrical movable member 9 (shaft) that is held between the driving roller 3 and the driven roller 2 and driven in the axial direction. **Akeno** is completely silent regarding a “lubricator”. The Examiner relies on the **Michioka** reference to teach the claimed “lubricator having applicators...”.

However, **Michioka** teaches a lubricant applying member 4 including a lubricant coater 42 that applies lubricant to ball rolling faces 11 of a track rail 1 (see col. 7, lines 52-57). As explained in the response filed on April 20, 2009, **Michioka** is completely unrelated to a system having a cylindrical shaft that is held between a driving roller and a driven roller and moved in the axial direction by rotation of the driving roller.

Because **Michioka** is completely unrelated to a system having a cylindrical shaft that is held between a driving roller and a driven roller, **Michioka** cannot disclose or suggest the claimed “a lubricator having applicators for applying lubricant only to contact portions of the

*[cylindrical] shaft with the driving roller and the driven roller*". That is, **Michioka** cannot disclose or suggest *where a lubricator* applies lubricant to a system having a *cylindrical shaft* that is held between a driving roller and a driven roller because **Michioka** does not disclose or suggest a system having a cylindrical shaft held between a driving roller and a driven roller.

Therefore, neither **Akeno** nor **Michioka** disclose or suggest *"a lubricator having applicators for applying lubricant only to contact portions of the [cylindrical] shaft with the driving roller and the driven roller"*.

It is noted that the above arguments were presented in the response filed on April 20, 2009. The Examiner has not responded to these arguments. Accordingly, it is respectfully submitted that the Examiner's response is not complete, as required by 37 C.F.R. §1.104 (see MPEP §707.07).

*The combination of **Akeno** and **Michioka** does not disclose or suggest "wherein said lubricator has an opening which is formed in a side of said lubricator and which has such a shape and a size as to allow said lubricator to be attached to and detached from said shaft, and wherein said lubricator is allowed to be attached to and detached from said shaft through said opening in a direction perpendicular to the axial direction of said shaft."*

The Office Action addresses this argument in several ways, each of which will be discussed below.

First, the Examiner indicates that the claimed "opening" in the lubricator is disclosed by **Michioka** in Fig. 4, near element 55 (see Office Action, page 3, lines 6). Applicants acknowledge that Fig. 4 of **Michioka** generally illustrates a lubricant coater 42 having an opening.

Further, the Office Action asserts that the “lubricator [shown in Fig. 4] is *capable of* being attached to and detached from said shaft in a direction perpendicular to the axial direction thereof” (emphasis added). See Office Action page 3, lines 8-9. Applicants respectfully disagree with the Examiner regarding this point.

More specifically, the lubricator coater 42 (or lubricant supplying member 4) of **Michioka** is not *capable of* being attached to and detached from said shaft in a direction perpendicular to the axial direction thereof. That is, as explained in the response filed on April 20, 2009, although **Michioka** does teach that the lubricant supplying member 4 has an opening, a width of a lower portion of the opening is significantly *less than* a width of the track 1 past which the lubricant supplying member 4 would have to pass to allow it to be attached to and detached from said shaft through said opening in a direction perpendicular to the axial direction of said shaft.

In other words, the structure of the **Michioka** lubricant supplying member 4 is such that it is *not* capable of being attached to and detached from the track 1 in a direction perpendicular to the axial direction of the track 1. And, it is submitted that if one attempted to attach or detach the lubricant supplying member 4 to/from the track 1 in a direction perpendicular to the track 1, the lubricant supplying member would be broken rendering it unsuitable for use.

Therefore, it is respectfully submitted that neither **Akeno** nor **Michioka** disclose or suggest a “lubricator [having] an opening ...which has such a shape and a size...wherein said lubricator is allowed to be attached to and detached from said shaft through said opening in a direction perpendicular to the axial direction of said shaft.”

Second, in response to the arguments presented in the April 20, 2009 Amendment, the Examiner asserts the following:

The amendments made to the present invention do not further limit the invention, they merely add functional language. The limitation “has an opening formed in a side of said lubricator” is broad on which any void or space on the lubricator can be read on. (See pages 4 and 5, lines 1-5 of Item 5 of the Office Action.)

The Examiner also states the following:

The functional recitation “to allow” has not been given patentable weight because it is in narrative form. In order to be given patentable weight, a functional recitation must be expressed as a “means” for performing the specified function, as set forth in 35 USC 112, sixth paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. (See page 3, lines 10-15 of Office Action.)

As will be discussed below, the Examiner’s position regarding how functional language in claims is to be construed is not supported by the current case law and is not supported by the guidelines set forth in the MPEP.

More specifically, the Manual of Patent Examining Procedure (MPEP) §2173.05(g) provides the following guidelines for examining functional limitations in claims:

A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients).” *There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper* [emphasis added]. In re Swinehart, 439 F.2d 210, 169 USPQ 226, C.C.P.A (1971).

The MPEP goes on to state

A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step.

The *Swinehart* court noted that functional language, just like any other language in a claim, may present a problem of definiteness under 35 U.S.C. §112, second paragraph; may present a problem of inadequate disclosure under 35 U.S.C. §112, first paragraph; or may present a problem of novelty and non-obviousness. However, so long as functional language in a claim steers clear of these three difficulties, *it is permissible*.

Therefore, the Examiner's assertions that "The amendments made to the present invention do not further limit the invention, they merely add functional language" and "The functional recitation 'to allow' has not been given patentable weight because it is in narrative form" are without basis in the law.

It is submitted that it is improper for the Examiner to simply dismiss the language "to allow..." as not further limiting the claim simply because it is functional language. The Examiner *must* consider the functional language when considering novelty and non-obviousness of the claims.

Finally, the Examiner's assertion that "In order to be given patentable weight, a functional recitation *must be* expressed as a 'means' for performing the specified function, as set

forth in 35 USC 112, sixth paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language” is simply incorrect.

Purely functional claim language is permissible under §112, sixth paragraph. However, its scope is limited to the corresponding structure, materials or acts described in the specification and equivalents thereof. However, §112, sixth paragraph, in no way prohibits claiming a structure and a corresponding function performed by that structure.

In fact, if the Examiner reviews MPEP §2181, which relates to interpretation of claims under §112, sixth paragraph, it will be clear that a claim that invokes §112, sixth paragraph, must not include the recitation of structure; whereas, a claim that does not invoke §112, sixth paragraph, must include sufficient structural limitations *for performing the claimed function*.

In other words, the discussion in MPEP §2181 makes clear that a claim may be recited in purely functional terms where there is no structure recited (i.e., means-plus-function) or, alternatively, may be recited in terms of a structure and a function that is performed by that structure. In the former case, the scope of the claim is limited to the corresponding structure recited in the specification. In the latter case, the structure is defined in the claim itself.

The MPEP §2181 makes clear that functional limitations in a claim are permitted, and must be considered just like any other limitation, whether the functional limitation is expressed in means-plus-function language or is expressed as a function performed by a particular structure.

Therefore, the rejection under §103 is improper for the additional reasons set forth above.

A rejection under §103 requires that the combination of teachings applied against the claims must disclose, suggest or render obvious all elements recited in the claims. As discussed



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above, it is respectfully submitted that the combination of **Akeno** and **Michioka** do not disclose, suggest or render obvious all elements recited in dependent claim 1. Accordingly, it is submitted that claim 1, and claims 2-5 which depend therefrom, patentably distinguish over the cited combination of references. Accordingly, reconsideration and withdrawal of the rejection under §103 are respectfully requested.

### **CONCLUSION**

In view of the foregoing, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

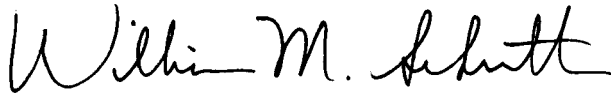
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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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Attachments: Abstracts: JP 2007-057024  
JP 2007-127240  
JP 2007-146874  
JP 2008-095913  
JP 2009-068650

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2007-057024

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(51)Int.Cl.

*F16H 25/22 (2006. 01)*

*F16H 25/24 (2006. 01)*

(21)Application number : 2005-244490

(71)Applicant : NSK LTD

(22)Date of filing : 25.08.2005

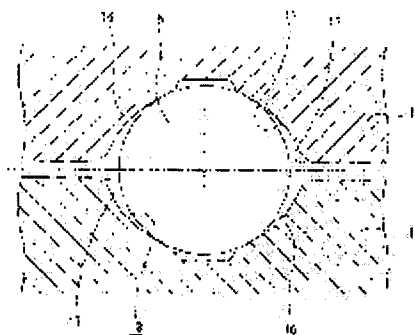
(72)Inventor : NOBUTOMO MASAHIRO  
MORIYAMA MASAHIRO

### (54) BALL SCREW

#### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a ball screw in which the curvature radius of a circular arc face is optimally determined for a plurality of load values.

**SOLUTION:** In this ball screw provided with spiral ball rolling grooves 13, 14 on a screw outer peripheral face and a nut inner peripheral face by combining two circular arc faces 16 into the gothic-arc shape, the curvature radius of the circular arc face 16 is continuously changed from a central portion toward a side edge portion of the ball rolling groove.



## PATENT ABSTRACTS OF JAPAN

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	<i>F16H 25/20</i>	<i>(2006. 01)</i>
	<i>F16H 25/24</i>	<i>(2006. 01)</i>

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(21)Application number : 2005-322302

(71)Applicant : NSK LTD

(22)Date of filing : 07.11.2005

(72)Inventor : TAKAHASHI DAIKI

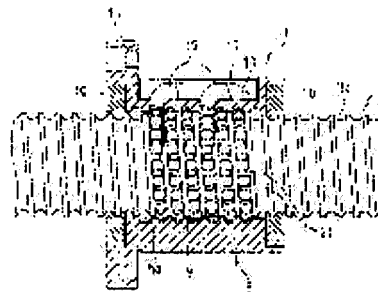
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### (54) BALL SCREW, ELECTRIC INJECTION MOLDING MACHINE, AND ELECTRIC PRESS DEVICE

#### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a ball screw which has a long life even when it is used under the condition that a heavy load is imposed.

**SOLUTION:** The ball screw 1 is provided with a screw shaft 3 having a screw groove 3a, a nut 5 having a screw groove 5a, and a plurality of balls 9 loaded into a ball-rolling path formed by both of the screw grooves 3a, 5a. The screw grooves 3a, 5a are Gothic-arc shaped grooves, and have nearly V-shaped profiles formed by the combination of two circular arcs of different curvature center. Then the radius of curvature of the two curved surfaces constituting the groove surface of the Gothic-arc shaped grooves is from 51% to 52% of the diameter of the ball 9. Then grease containing impalpable particles of a solid lubricant, which range in size from 0.5  $\mu$ m to 10  $\mu$ m in diameter, is arranged in the ball-rolling path, and the groove surfaces of both of the screw grooves 3a, 5a and the surface of the ball 9 are lubricated by the grease.



# PATENT ABSTRACTS OF JAPAN

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(21)Application number : 2005-338076

(71)Applicant : TOYOTA MOTOR CORP

(22)Date of filing : 24.11.2005

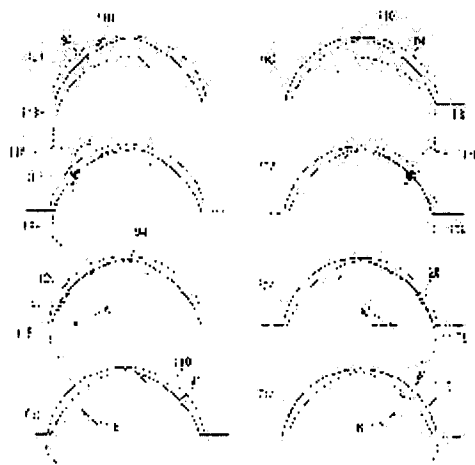
(72)Inventor : MITO TOSHIYASU

## (54) BALL SCREW AND NUT MANUFACTURING METHOD FOR BALL SCREW

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a ball screw capable of operating more smoothly than a conventional ball screw.

**SOLUTION:** A female screw groove 94 of a nut body has a Gothic arc shape, and a connection groove 110 of a piece member has a semicircular shape. In a first gradual change groove cutting process, a rotation locus 118 being the partial spherical face of the cutting edge of an end mill 116 is brought into contact with the same point P at a position in the radial direction of the female screw groove 94 as a contact point of the female screw groove 94 with a ball (b), (f). The rotation locus 118 is moved in the direction of the width of the female screw groove 94 in accordance with the travel of the end mill 116 in the lead direction of the female screw groove to form a first gradual change groove 120 (c), (g). In the next second gradual change groove cutting process, the rotation locus 118 is moved in the direction having both components including the direction of the width and the direction of the depth of the female screw groove 94 to form a second gradual change groove 122 (d), (h). Consequently, the positions in the radial direction of contact points of the inner face of the first gradual change groove 120 of the ball and the inner face of the female screw groove 94 become the same, and revolution speeds of the balls become equal to each other to guarantee the smooth operation of the ball screw.



# PATENT ABSTRACTS OF JAPAN

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	<i>H02K 7/116</i>	<i>(2006. 01)</i>
	<i>G01B 7/00</i>	<i>(2006. 01)</i>

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(21)Application number : 2006-281008

(71)Applicant : NTN CORP

(22)Date of filing : 16.10.2006

(72)Inventor : TATEISHI YASUSHI  
YOSHIDA HIRAKAZU

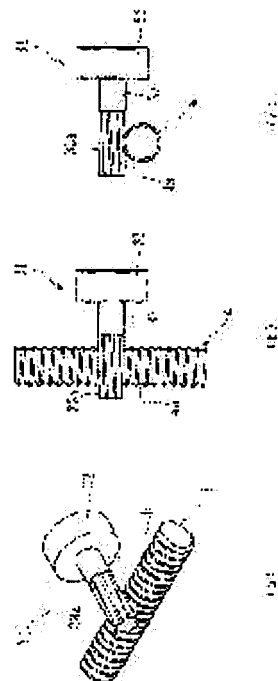
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## (54) ELECTRIC ACTUATOR

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an electric actuator capable of saving space and detecting position of a ball screw shaft at low cost.

**SOLUTION:** A detection means 31 detecting axial movement quantity of the ball screw shaft 4 is arranged in a left side of a figure of a screw groove 4a of the ball screw shaft 4. The detection means 31 comprises a potentiometer 32 detecting axial movement quantity of the ball screw shaft 4 and a cylindrical engagement member 33 extending from a roughly center part of the potentiometer 32. Teeth 33a meshing with the screw groove 4a is provided on a tip of the engagement member 33. The teeth 33a is formed in such a manner that the same is twisted around the shaft to meshing with the screw groove 4a when the ball screw shaft 4 moves in an axial direction. A section shape of a projection part of the teeth 33a is formed in a circular arc shape or a Gothic arc shape with matching with a shape of the screw groove 4a.



# PATENT ABSTRACTS OF JAPAN

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	<i>F16H 25/22</i>	<i>(2006. 01)</i>

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(21)Application number : 2007-239887

(71)Applicant : NSK LTD

(22)Date of filing : 14.09.2007

(72)Inventor : SATO RYOICHI

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## (54) LINEAR MOTION ACTUATOR

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a means reducing friction resistance in a linear motion actuator such as a linear guide device.

**SOLUTION:** In a linear guide device 1 which is provided with: a rail 2 having rail track grooves 4 each formed in a Gothic arc shape on an outer shape surface; a slider 5 having slider track grooves 7 each formed in a Gothic arc shape and facing the rail track grooves 4 on an inner shape surface; load paths 10 formed with the rail track grooves 4 and the slider track grooves 7; and a plurality of balls 8 rolling in the load paths 10, and in which the balls 8 are brought into point contact with the rail track grooves 4 and the slider track grooves 7, contact angles  $\alpha$  between the balls 8, and the rail track grooves 4 and the slider track grooves 7 are set smaller than  $45^\circ$ .

